Florent Guiotte

florent@guiotte.fr
guiotte.fr
fguiotte
fguiotte

Computer Scientist, Ph.D.
Images and 3D data processing, remote sensing and machine learning.

Professional and associative experiences

2022 **Researcher**, *L'Avion Jaune*, Montpellier (France)
Position Research, development and production of remote sensing products.
Keywords Remote sensing, GIS, multispectral imaging, semantic segmentation, classification, detection.

2021 **Post-doctorate**, *IRISA×L'Avion Jaune*, Montpellier (France)
Topic Ultra-high resolution semantic segmentation for characterizing the spatial distribution of plants.
Supervisors Sébastien Lefèvre & Michel Assembaum.
Keywords Remote sensing, multispectral imaging, semantic segmentation.

2020 **Research Associate**, *IRISA*, Vannes (France)
Topic Ship detection in synthetic aperture radar (SAR) images using morphological hierarchies.
Keywords Remote sensing, SAR, mathematical morphology.

2019 **Volunteer, organiser & facilitator**, *Pint of Science*, Rennes (France), annual science festival

2016 **Volunteer**, *PYCONfr*, Rennes (France), annual french Python convention

2016 **Research Associate Internship**, *Technicolor R&I*, Rennes (France)
Topic 3D cage-based mesh deformations for facial editing.
Supervisors Quentin Avril & François Le Clerc.
Keywords 3D computer graphics, Python, NumPy, geometry processing.

2015 **Software Engineer Internship**, *InPixal*, Rennes (France)
Topic Develop a real time photorealistic drone turret simulator.
Supervisors Nicolas Ramin & Sylvain Fabre.
Keywords GIS, C++, OpenGL, OSGEarth.

2014 **Cofunder and treasurer of the ESIR junior enterprise**, Rennes (France)

2013 **Software Developer Internship**, *eXit research group*, Univ. of Sherbrooke (Canada)
Topic Develop an open-source vector graphics editor.
Supervisor Rubén González-Rubio.
Keywords Vector graphics, Java, software quality, design patterns, scrum, TDD.

Education

2021 **Ph.D in Computer Science**, *Univ. Rennes 2*, Rennes (France)
Title "2D/3D discretization of LiDAR point clouds: Processing with morphological hierarchies and deep neural networks".
Supervisors Thomas Corpetti (CNRS senior researcher, France) & Sébastien Lefèvre (Univ. of South Brittany full professor, France).
Jury Maria Vakalopoulou (CentraleSupélec associate professor, France), Ewa Kijak (Univ. Rennes 1 associate professor, France), Clément Mallet (IGN senior researcher, France), Dimitri Lague (CNRS senior researcher, France), Pedram Ghamisi (Helmholtz-Zentrum Dresden-Rossendorf senior researcher, Germany), Beatriz Marcotegui (MINES ParisTech full professor, France).
Keywords Remote sensing, LiDAR data, mathematical morphology, machine learning, deep learning.

2016 **M.Sc.Eng in Computer Science**, *ESIR*, Rennes (France)
Specialization Computer vision & computer graphics.
Keywords Image processing, image & video compression, CGI, machine learning.

Exchange

2019 **Academic Exchange**, *Chinese Academy of Sciences*, Beijing (China)
Topic Full-waveforms LiDAR classification with deep learning.
Keywords Remote sensing, LiDAR data, full waveform, deep learning.

Skills

DevOps
- Linux
- Docker/Swarm
- Git, DVC
- TDD, CI/CD

Python
- NumPy, SciPy
- PyTorch, fastai
- Pandas, PonyORM
- PDAL, rasterio, GeoPandas

Specialist knowledge
- Computer vision
- Remote sensing
- Machine learning
- LiDAR data & geometry processing

Teaching

Year	University	Title	Type	Hours
2020	Univ. Bretagne Sud (Copernicus Master)	Hierarchical representations	Tutorial	4
2019	Univ. Rennes 1	Indexing of multimedia databases	Lecture	15
2018	Univ. Rennes 2	Graphical design	Tutorial	16
2017	Univ. Rennes 2	Graphical design	Tutorial	8
2017	Univ. Rennes 2	Digital mapping	Tutorial	8

Packages

Simple Attribute Profiles (SAP), *Python package*, `https://github.com/fguiotte/sap`
Topic Compute morphological hierarchies of images, morphological Attribute Profiles, and more.
Keywords Mathematical morphology, machine learning, software quality, TDD, CI/CD.

Publications

[1] Hoàng-Ân Lê, Florent Guiotte, Minh-Tan Pham, Sébastien Lefèvre, and Thomas Corpetti. "Learning Digital Terrain Models From Point Clouds: ALS2DTM Dataset and Rasterization-Based GAN". In: *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 15 (2022), pp. 4980–4989. arXiv: 2206.03778.

[2] Deise Santana Maia, Minh-Tan Pham, Erchan Aptoula, Florent Guiotte, and Sébastien Lefèvre. "Classification of Remote Sensing Data With Morphological Attribute Profiles: A Decade of Advances". In: *IEEE Geoscience and Remote Sensing Magazine* 9.3 (Sept. 2021), pp. 43–71. URL: https://hal.science/hal-03199357.

[3] Adèle Colas, Florent Guiotte, Fabien Danieau, François Le Clerc, and Quentin Avril. *Fat Pad Cages for Facial Posing*. Oct. 12, 2020. arXiv: arXiv:2010.05528. URL: http://arxiv.org/abs/2010.05528 (visited on 01/25/2023). preprint.

[4] Florent Guiotte, Geoffroy Etaix, Sébastien Lefèvre, and Thomas Corpetti. "Interactive Digital Terrain Model Analysis in Attribute Space". In: *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* XLIII-B2-2020 (2020), pp. 1203–1209. URL: https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLIII-B2-2020/1203/2020/.

[5] Florent Guiotte, Minh-Tan Pham, Romain Dambreville, Thomas Corpetti, and Sébastien Lefèvre. "Semantic Segmentation of LiDAR Points Clouds: Rasterisation beyond Digital Elevation Models". In: *IEEE Geoscience and Remote Sensing Letters* (Jan. 2020). URL: https://hal.archives-ouvertes.fr/hal-02399410.

[6] Florent Guiotte, Mengbin Rao, Sébastien Lefèvre, Ping Tang, and Thomas Corpetti. "Relation Network for Full-waveforms LiDAR Classification". In: *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* XLIII-B3-2020 (2020), pp. 515–520. URL: https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLIII-B3-2020/515/2020/.

[7] Florent Guiotte, Sébastien Lefèvre, and Thomas Corpetti. "Attribute Filtering of Urban Point Clouds Using Max-Tree on Voxel Data". In: *Mathematical Morphology and Its Applications to Signal and Image Processing*. May 2019, pp. 391–402. URL: https://hal.archives-ouvertes.fr/hal-02343890.

[8] Florent Guiotte, Sébastien Lefèvre, and Thomas Corpetti. "Rasterization Strategies for Airborne LiDAR Classification Using Attribute Profiles". In: *2019 Joint Urban Remote Sensing Event*. IEEE, 2019, pp. 1–4. URL: https://hal.archives-ouvertes.fr/hal-02343901/document.

[9] Florent Guiotte, Sébastien Lefèvre, and Thomas Corpetti. "Voxel-Based Attribute Profiles on Lidar Data for Land Cover Mapping". In: *IEEE International Geosciences and Remote Sensing Symposium*. Yokohama, Japan, 2019. URL: https://hal.archives-ouvertes.fr/hal-02343963.